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ABSTRACT

In the past, linguistic descriptions of the relationships common to passive sentences have not been universally applicable. Junction grammar, a type of generative grammar, is a model that may provide a means of describing universal passive relationships. Junction grammar differs from transformational grammar in that its rules (1) claim other relationships between contiguous elements besides concatenation, i.e., adjunction, subjunction, and conjunction; and (2) model the specific operation relating constituents to each other, giving rise to dominating categories containing them, as opposed to rewriting single grammatical category symbols as the immediate constituents making up those categories. Adjunction adjoins two unlike categories to produce a third, new category dominating them. Conjunction consists of the conjoining of two or more identical categories so that the resulting, dominating category is identical to the conjoined categories. Subjunction is either "modifying" or "recategorizing." Modifying subjunction consists of relative clause modification with or without interjunction. Recategorizing subjunction involves the nominalization of a verb or predicate, the adjectivalization of a verb, or the nominalization of a sentence as a complement clause. The deep structure for passive sentences involves both modifying subjunction and recategorizing full subjunction, and appears to be universal. (AM)

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Modeling Universal Relationships in Passive Sentences

In Aspects of the Theory of Syntax Chomsky wrote, ". . . I shall simply point out that the syntactic and semantic structures of natural language evidently offer many mysteries, both of fact and of principle, and that any attempt to delimit the boundaries of these domains must certainly be quite tentative."

Chomsky's recognition of the limitations of any model, including his own, is as welcome in linguistic circles as it is forgotten. Unfortunately, the wisdom that prompted his comment has not always tempered the attitudes of those who have followed his, or any other model. Too often our tentative insights have evolved into rigid, limiting orthodoxes that have blinded us to other insights.

I cite, for example, the rigidity with which we have clung to the passive transformation to describe the systematic operation of past participles and affix alternations: I have witnessed some persons trying to apply the same passive transformational rule (with only slight modifications) to languages other than English, losing sight of the fact that the rule is strictly an English linear constituent description. After such rules are written, they are seldom intuitively satisfying and seldom capture any significant generalizations beyond showing immediate constituent groupings. Otherwise, I am not aware of significant generalizations captured by such a practice.

Yet there are common relationships present in the passive sentences of all languages. The question is how can these relationships be captured in a linguistic description which could have universal applicability. It is in the spirit of Chomsky's concession and caution that I suggest that there is a way of capturing possibly universal passive relationships in a linguistic description. The way I refer to is in junction grammar, a type of generative grammar that has been used in computer processing of language for nearly a decade now at Brigham Young University. Since most of the publications on this approach are found in computational linguistics journals, most linguists and language teachers have not become aware of it.* This neglect is truly unfortunate, because the grammar is proving to be a remarkably efficient model for the description of language from which many of us could benefit.

I would like to explain the main operations of the grammar and then show how passive sentences from several languages can be modeled in a consistent way with it.

The deep structure trees in a junction grammar are produced by a set of junction rules, just as the tree structures in a transformational grammar are produced by a set of phrase structure rules, but that is where the similarity ends. While phrase structure rules are essentially rules for identifying possible nested constituents in linear strings, and claim only one relationship (concatentation) between contiguous elements, junction grammar rules, in addition to modeling nested constituents, claim other relationships termed adjunction, subjunction, and conjunction between contiguous elements.

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*Lytle, E. G., et. al. "Junction Grammar as a Base for Natural Language Processing," American Journal of Computational Linguistics, 72, pp. 1975b.

In a transformational grammar, phrase structure rules rewrite single grammatical category symbols as the immediate constituents making up those categories. Thus the rules begin with the single category S and expand it with subsequent rules until all nested parts are explicit, and the entire sentence has been described. In contrast, junction grammar rules model the specific operation (adjunction, subjunction, conjunction) relating constituents to each other, and giving rise to dominating categories containing them. This process is repeated, relating immediate constituents to each other with a resulting dominating category with each operation, until the highest dominating category representing sentence is reached. The difference in the form and function of the contrasting rules is shown briefly on page one of the handout. [Handout or Overhead Projection]

Phrase Structure Rules

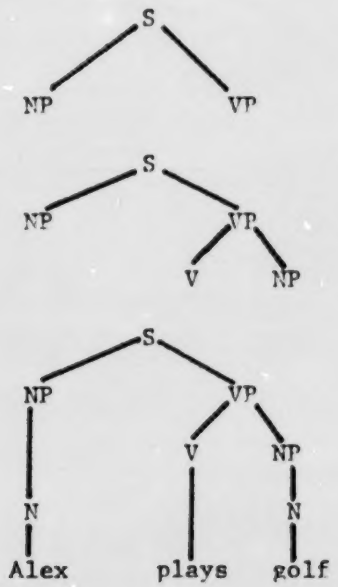
1. S ⟶ NP + VP

2. VP ⟶ V + NP

3. NP ⟶ N

   plus lexical rules

Structural Results

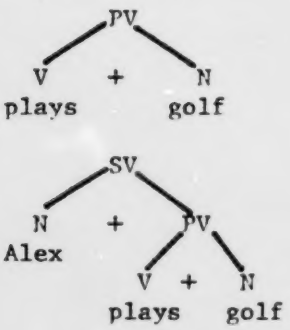


Junction Rules

1. V + N = PV
   (to be read: V adjoined to N produces PV)

2. N + PV = SV
   (to be read: N adjoined to PV produces SV)

Structural Results



The symbols V, N, PV, and SV are sememe symbols, but for our discussion we will consider them roughly equivalent to verb, noun phrase, verb phrase, and sentence, respectively. The justification for the change in symbols will follow.

Generally stated, junction rules are concerned with building sentences from nuclear parts, associating those parts with various operations (only adjunction is shown above). Phrase structure rules are concerned with defining possible constituents of given categories.

Adjunction

The operation of adjunction briefly illustrated in the handout is defined as that operation which adjoins two unlike categories to produce a third, new category (unlike either of the two) dominating them both. Thus, when a verb (V) is adjoined with a noun phrase (N), the result is a new, dominating category, predicate (PV). When a noun phrase (N) is adjoined to a predicate (PV), the result is a new, dominating category, sentence (SV). The letter V in the symbols for predicate and sentence refer to the notion that the verb is the "core" or central part of these constructions. This notion becomes important at later points of the gram-

mar in which other categories function as the cores. For example, other instances of adjunction include a preposition (P) adjoined to a noun phrase (N), resulting in a dominating category, predicate with a preposition as its "core" (PP). The rule, P + N = PP, would account for the prepositional phrase in a sentence like, "Jack is in the laboratory."

Conjunction

The second, and probably simplest operation in the junction rules, is conjunction. This operation consists of the conjoining of two or more identical categories so that the resulting, dominating category is identical with the conjoined categories. Thus the phrase, Joe and Alan consists of conjoined N's dominated by an N phrase category: the phrase eat and sleep contains conjoined V's dominated by a V: and the phrase "eat tacos and drink uncola" consists of conjoined PV's dominated by PV. This operation is not our immediate concern.

Subjunction

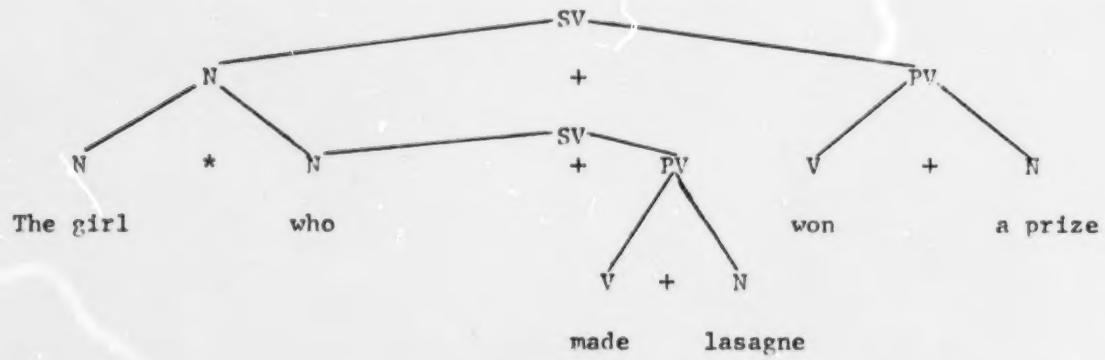
There are two major types of subjunction in the grammar: I will call them modifying subjunction and recategorizing full subjunction. Both types are used in passive sentences.

Modifying Subjunction.--Transformational grammar hints at a modifying subjunction relationship by the way it subordinates relative clauses, but since modification is not explicitly shown in that grammar, the implicit, adjectival modification of the subordinated relative clause is not generalized to other instances of modification. If it were, adverbs would be subordinated to the categories they modify in a manner similar to the subordination of relative clauses. Adverbs modifying single verbs would be subordinated to those verbs: adverbs modifying entire sentences would

be subordinated to those preciates, and adverbs modifying entire sentences would be subordinated to those sentences. Of course, transformational grammar does not allow for such explicit modeling of modification, but junction grammar does. Indeed, one of the most appealing features of the grammar is the way it handles nested modifiers; that is, how it shows that in a sentence such as "Annette played her flute upstairs yesterday," upstairs modifiess played her flute, and yesterday modifies played her flute upstairs. But enough commentary until we have viewed the rules for modeling subjunction.

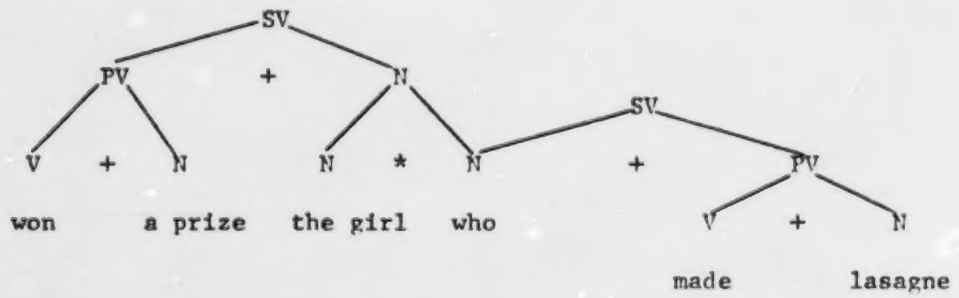
In case of relative clauses the grammar identifies the operation of interjunction, or intersection associated with some subjunctions. Specifically, when one sentence is subordinated to another as a relative clause, each can be viewed as a linguistic set intersecting with the other at the point of their common membership. This intersection, or interjunction, is usually marked with a wh-pro form. Thus, the sentence, "The girl who made lasagne won the prize," is composed of two sentences intersecting at the point of common membership (the girl), as one is subordinated directly to the noun phrase of the other. The resulting who-pro form marks the restricting member of the interjunction.

The rule describing subjunction with interjunction is written: N * N/SV = N, and is read: noun phrase (N) is subjoined to a noun phrase (N) of another sentence (SV), producing a dominating category, noun phrase (N).

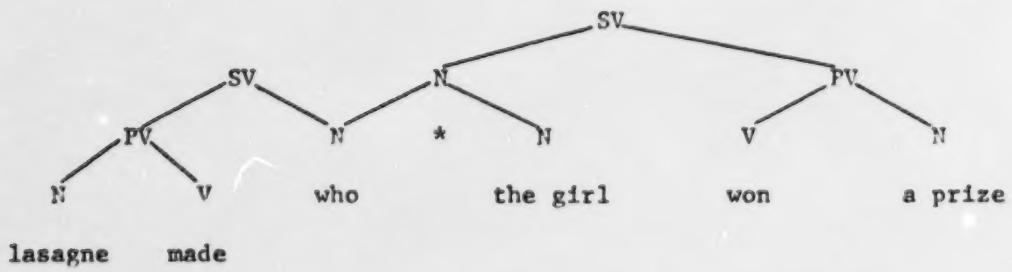


The girl who made lasagne won a prize.

Incidently, the word order of the deep structure trees is irrelevant, since the relationships hold regardless of linear ordering. The tree could just as well have been shown with the following variations: [Handout and/or overhead projection]



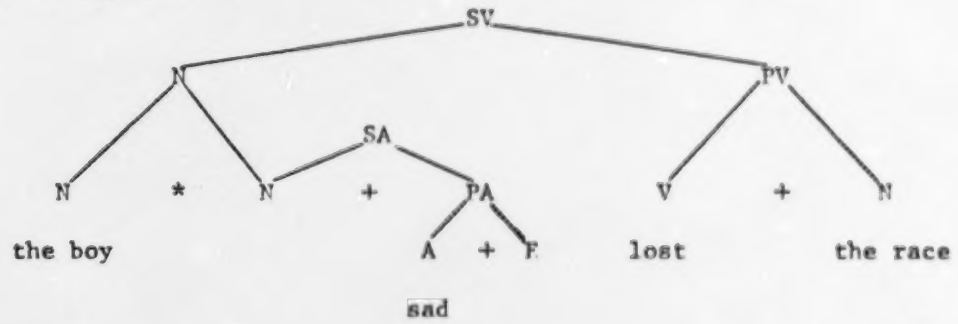
-or-



Turning now from restrictive relative clause modification involving interjunction, we can view how single adjective modifiers are structured. They too are subjoined, but no interjunction occurs. The adjective (A) is viewed as the core of a predicate (PA), which is dominated by a structure (SA), which in turn is subjoined to (modifying) the noun phrase (N). The description for the sentence, "The sad boy lost the race," would be as follows: [Handout and/or overhead projection]

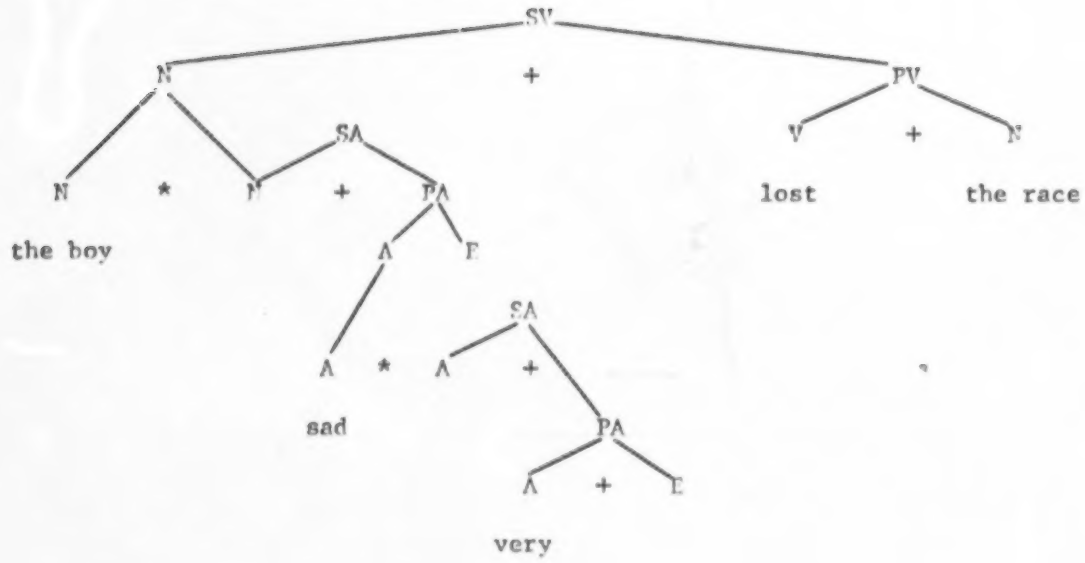
Rules for structure and subordination of adjective:

A + E = PA
N + PA = SA
N * N/SA = N



The sad boy lost the race.

The symbol E, denoting that the node is "empty," could be omitted, but its presence adds symmetry to the diagram (and to the rules), and aids in computer processing. There are theoretical reasons for including the SA and PA nodes dominating the A (Bush, 1977: 30-37), but they exceed our immediate purpose. If further modification of the adjective is desired, the mechanism for modeling it is the same: Another structure is subjoined to the adjective in the same way. Consider the sentence, "The very sad boy lost the race."



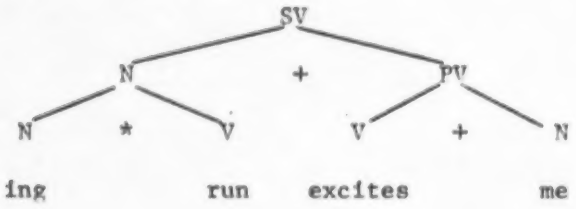
The very sad boy lost the race.

The structure shows that very modifies the adjective sad, and the structure very sad modifies boy. Together, the entire complex is a noun phrase (N).

Adverbial modification is shown in the same; however, time does not allow illustrations.

Recategorizing Full Subjunction.--The second type of subjunction, recategorizing full subjunction, is present when either a verb or predicate is nominalized,when a verb is adjectivalized or when a sentence is nominalized as a complement clause. The rule showing recategorizing full subjunction of V to N (N * V = N), does not contain a slash identifying a different structure to which the subjoined part belongs--as is the case with a relative clause--because it belongs to the immediate category to which it is being subjoined--hence the term, recategorizing full subjunction. Consider the diagram showing the result of this rule: [Handout and/or overhead projection]

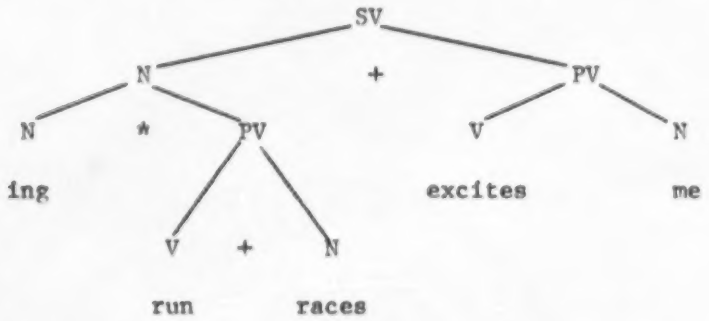
Rule for recategorizing subjunction (nominalization of V): N * V = N



Final string: Running excites me.

The tree indicates that the verb run has been recategorized as N; that is, the verb has been nominalized. The gerundive ing is the marker of this type of nominalization. The nominalization of a predicate (PV) follows the same pattern:

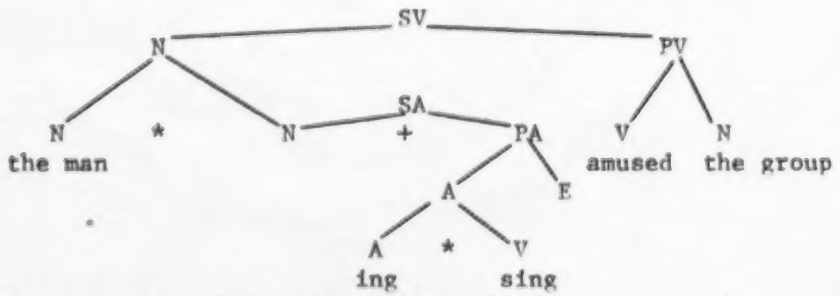
Nominalization of PV: N * PV = N



Final string: Running races excites me.

Other kinds of recategorizations are modeled similarly. For example, an adjectivalized verb (participle) results from the rule, A * V = A:

Adjectivalization of V: A * V = A

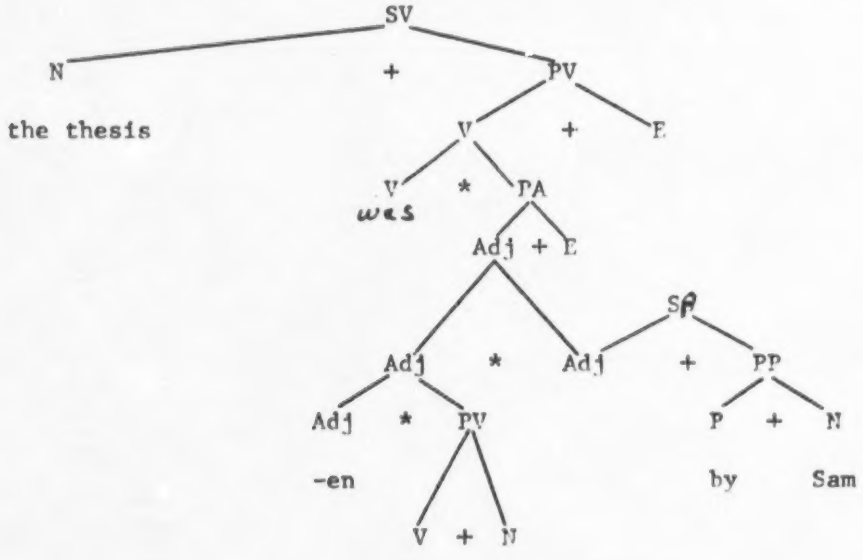


Final string: The singing man amused the group.

Complete sentences also undergo recategorizing subjunction, resulting in complement clauses.

Passives

The deep structure diagram for passive sentences reveals both modifying subjunction and recategorizing full subjunction. The deep structure diagram for the passive sentence "The thesis was written by Sam," is the following:



The thesis was written by Sam.

The passive tree reveals that the dominating sentence (SV) does not contain a transitive verb, since the object node is empty (E), yet there is a transitive relationship in the predicate (write the thesis) which has be recategorized as an adjective (Adj) through the operation of recategorizing full subjunction. This adjectival (participial) phrase is then modified by the subjoined prepositional phrase, by Sam. The entire complex undergoes recategorizing subjunction by being subjoined to the verb

was, denoting the complement quality of the predicate (PA) following the be verb. The presence of the thesis in the object position of the re-categorized predicate accounts for the fact that in a passive sentence, the speaker feels at once both the subject and the object functions of this word. In English, of course, only the subject is spoken.

The[5] relationships, then, appear to be the universal relationships we feel about the passive sentences regardless of the language in question. The tree was produced by following the subset of J. G. rules:

Junction Rules for Simple Passive Sentences

V + N = PV

P + N = PP

Adj + PP = SP

Adj * PV = Adj

Adj * Adj/SP = Adj

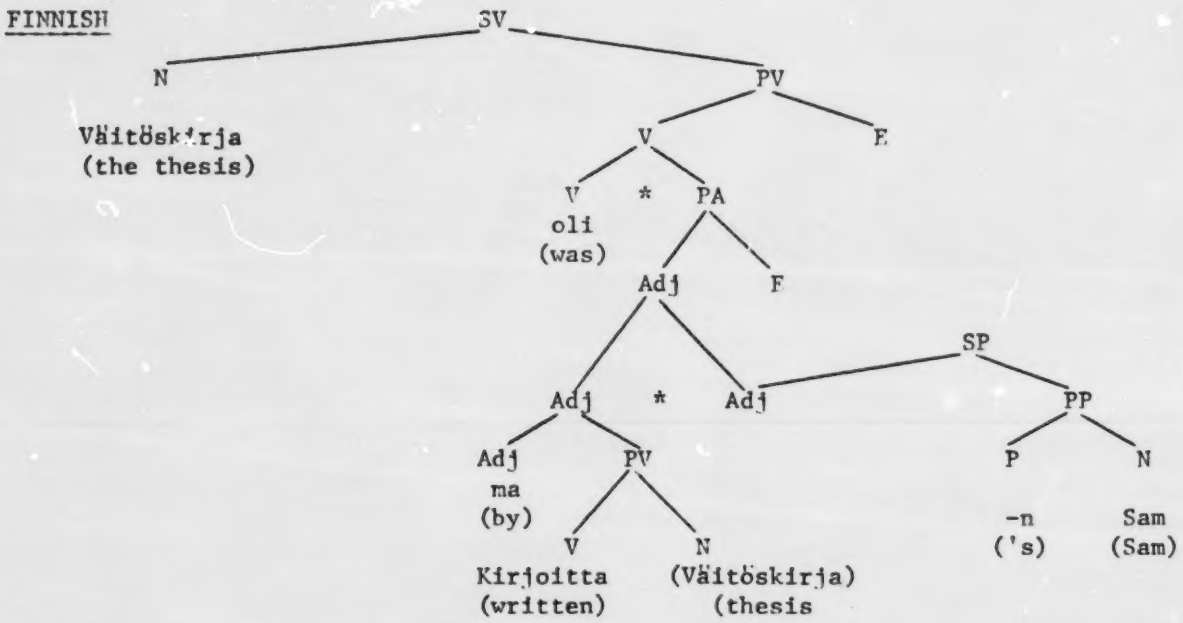
Adj + E = PA

V * PA = V

V + E = PV

N + PV = SV

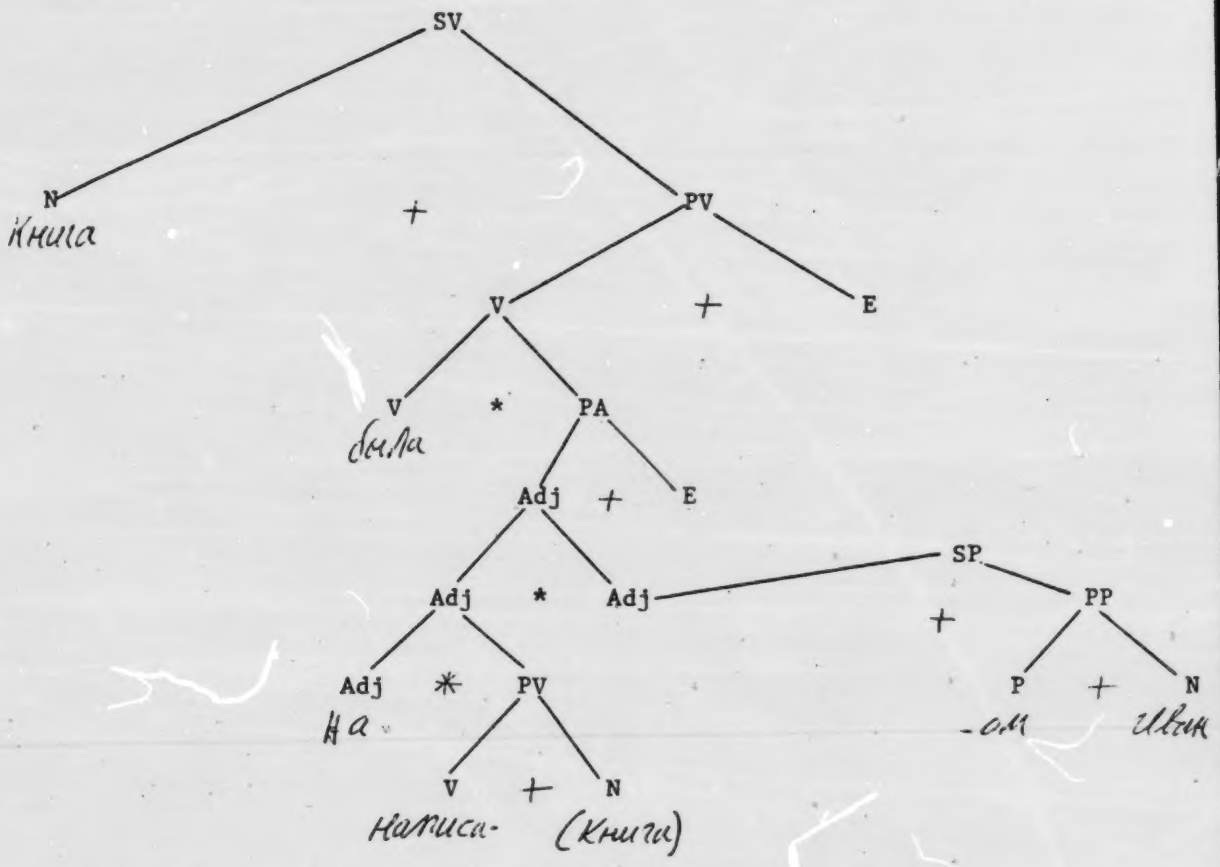
By using the same subset of rules we can model the passive relationships in many languages in a consistent way. In Finnish, for example, this sentence would read, "Vaitöskirja oli Samin kirjoittama (väitöskirja)." Translated with Finnish word order the sentence reads, "The thesis was Sam-by written (thesis)." Although the surface word order differs considerably from that of English, the deep structure relationships are the same: [Handout and/or overhead projection]



Väitöskirja oli Samin kirjoittama (väitöskirja).
The thesis was Sam-by written (thesis).

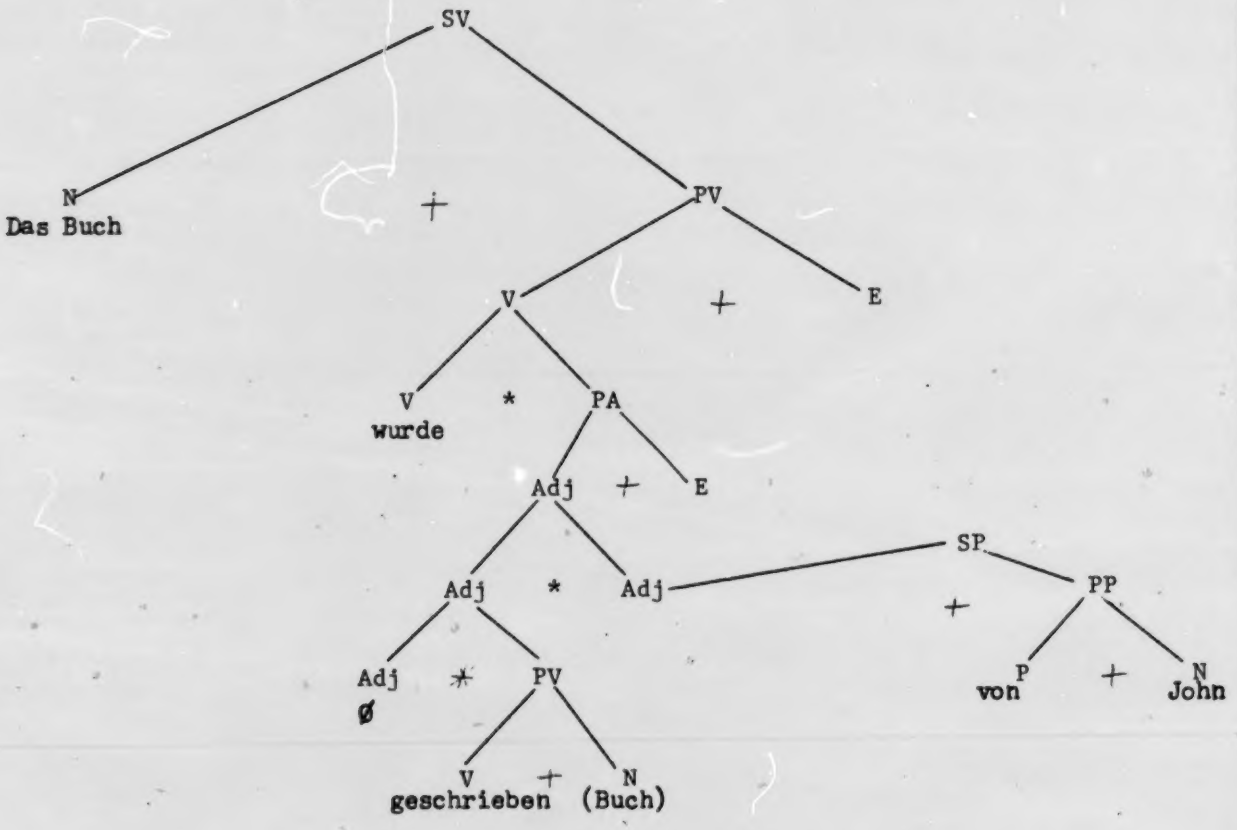
In the Finnish sentence the agent is clearly marked, and its functions as a modifier of the predicate which has been recategoriezed as an adjective phrase functioning as the predicate complement. Additional examples can be drawn from many languages. Consider the following additional examples from Russian, Spanish, German, and Japanese: [Handouts and/or overhead projection]

RUSSIAN



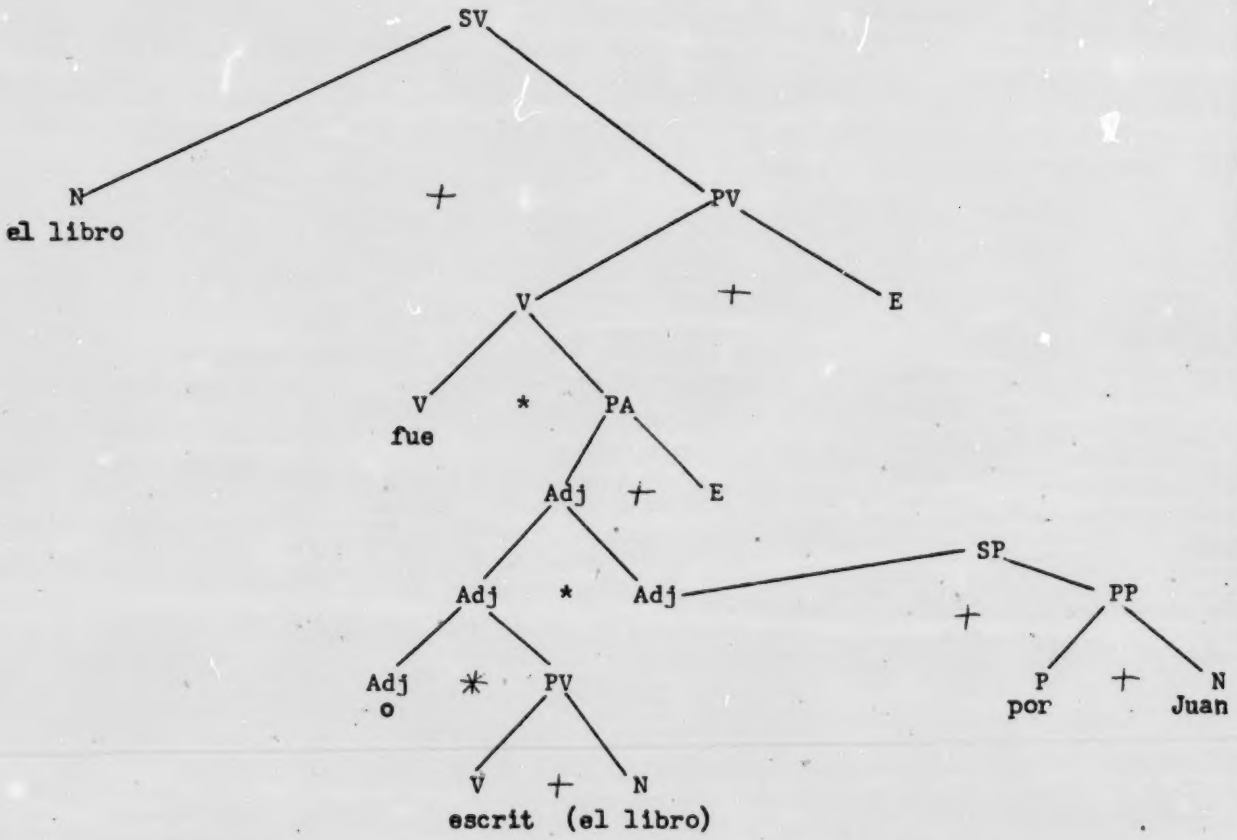
Книга (была) написана Иваном.

GERMAN



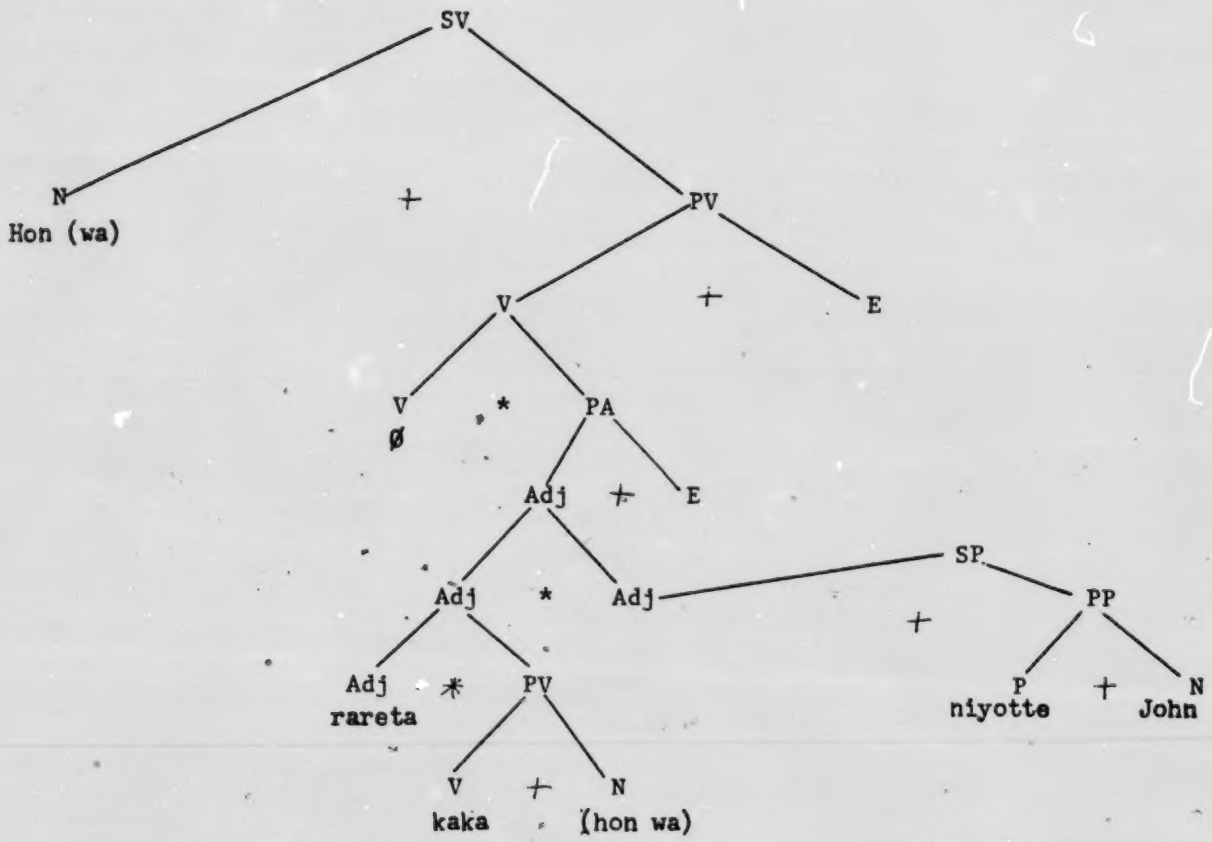
Das Buch wurde von John geschrieben.

SPANISH



El libro fue escrito por Juan.

JAPANESE



Hon wa John niyotte kakareta.
(the)book John by written-(was).

Conclusion

Unfortunately, times does not allow for more than a cursory glance at how universal passive relationships can be modeled consistently with junction grammar rules. I would like to think that Chomsky would be pleased that we believe his comment that any attempt to delimit the boundaries of syntax and semantics must be tantative. The descriptions of junction grammar must also be considered tentative, but first they deserve to be considered.